

**REMARKS**

Claims 1 to 20 and 22 to 33 are pending in the present application.

Claims 24 to 33 have been added. Support for claims 24 to 27 is at least found in Figures 2 to 4 and 7 to 20. Claim 28 recites that the liquid crystal material is a nematic liquid crystal, in accordance with the described embodiments. Support for claims 29 to 33 is at least found at page 11, lines 4 to 5.

Claims 1 to 20, 22, and 23 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 to 24 of copending Application No. 09/816,942 and claims 1 to 15 of copending Application No. 09/815,999. Since U.S. Patent Application No. 09/816,942 and U.S. Patent Application No. 09/815,999 have not yet issued, Applicants respectfully traverse this provisional rejection and that the rejection be held in abeyance until or when such copending application issues prior to the issuance of the present application.

Claims 1 to 4, 8, 10 to 14 and 23 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,754,264 to Bryan-Brown et al. (hereinafter "the '264 patent").

Applicants respectfully submit that the '264 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts, as required by claim 1 and independent claim 23. The '264 patent describes the use of monogratings or bigratings for alignment of a ferroelectric liquid crystal. Gratings are parallel grooves on the cell wall surface and are clearly not alignment posts. Accordingly, Applicants respectfully submit that claims 1 and 23 are patentably distinguishable over the prior art, and thus are in condition for allowance.

Applicants respectfully submit that claims 2 to 4, 8, and 10 to 14, which depend from claim 1, are also patentably distinguishable over the prior art for at least the reasons discussed above with respect to claim 1, and ,thus, are in condition for allowance.

Applicants respectfully submit that the '264 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts which have a height in the range of about 0.5 to 5  $\mu\text{m}$ , as required by claim 2, or which have a height in the range of about 1.0 to 1.2  $\mu\text{m}$ , as required by claim 3. The Action states that col. 3, lines 18 to 28 describe alignment "features have a height in the range of about 1-3 micrometers." The citation at col. 3, lines 18 to 28 does not disclose the height of an alignment structure, but describes the height of "small pillars" that are for "assisting in correct spacing apart of the cell walls and also for a barrier to liquid crystal material flow." These "small pillars" are clearly not the surface alignment structure of the '264 patent, but are additional to the embossed alignment grating. The '264 patent states that "[a]dditionally, the embossing may provide small pillars." Therefore, these separator pillars are not part of the alignment grating of the '264 patent and, thus, do not disclose or suggest a height of a surface alignment structure as in claims 2 and 3. Accordingly, Applicants respectfully submit that claims 2 and 3 are further patentably distinguishable over the prior art.

The Action states that col. 5, lines 11 to 19 describes "each feature has a width in the range of about 0.5  $\mu\text{m}$ ." Applicants cannot find any disclosure or suggestion at col. 5, lines 11 to 19 or anywhere else in the '264 patent of "each feature has a width in the range of about 0.5  $\mu\text{m}$ ."

The Action states that col. 3, lines 46 to 50 describes "the features are of at least one of a different height, different shape, different tilt and different orientation in different regions of the device." Applicants cannot find any disclosure or suggestion at col. 3, lines 46 to 50, or anywhere else in the '264 patent, of "the features are of at least one of

a different height, different shape, different tilt and different orientation in different regions of the device.”

Claims 15 to 20 are rejected under 35 U.S.C. § 102 (e) as being anticipated by U.S. Patent No. 6,549,256 to Bryan-Brown et al. (hereinafter “the ‘256 patent”).

Applicants respectfully submit that the ‘256 patent fails to disclose or suggest a surface alignment structure having an array of alignment posts, as required by claim 15 and claim 18. The Action asserts that Figures 11(a) to 11(c) describe a “surface alignment structure comprises an array of upstanding features (or posts) which are at least one of shaped and oriented to produce the desired alignment.” Figures 11(a) to 11(c) do not disclose or suggest an array of alignment posts. Figures 11(a) to 11(c) “show various grating structures that can be used in the present invention.” (col. 7, lines 46 to 47). Figure 11(a) “shows a cross-sectional view of a grating,” Figure 11(b) “shows a cross-sectional view of an asymmetric grating profile,” and Figure 11(c) “shows a cross-sectional view of a grating.” (col. 7, lines 47 to 52). *Webster’s Revised Unabridged Dictionary*, 1996, 1998 defines a grating as a “system of close equidistant and parallel lines or bars, especially lines ruled on a polished surface, used to produce spectra by diffraction – also called a diffraction grating.” A grating is also defined as “a surface with many parallel grooves in it” (<http://dictionary.reference.com>). A grating is not an array of alignment posts, but a surface with parallel grooves thereon. Figure 11 simply shows cross sections of various parallel grooves on a surface. Accordingly, claim 15 and claim 18 are patentably distinguishable over the prior art, and thus are in condition for allowance.

Applicants respectfully submit that claims 16 and 17, which depend from claim 15, are also patentably distinguishable over the prior art for at least the reasons discussed above with respect to claim 15, and, thus, are in condition for allowance.

Applicants respectfully submit that the ‘256 patent fails to disclose or suggest a surface alignment structure having an array of alignment posts which have a height that

is at least equal to the average spacing between the posts, as required by claim 16. The Action asserts that col. 8, lines 6 to 8 describes "features have a height that is at least equal to the average spacing between the features." In fact, col. 8, lines 6 to 8 state that "[t]ypical values for the a and L are 0.3  $\mu\text{m}$  and 1.0  $\mu\text{m}$  in the range of about 0.05  $\mu\text{m}$  to 5  $\mu\text{m}$  and 0.10 to 10  $\mu\text{m}$  respectively." Col. 6, line 59 states "a is the groove depth and L is the grating pitch" of a grating, not an array of alignment posts. Thus typically, the groove depth is much smaller than the grating pitch. Therefore, the '256 patent does not disclose or suggest posts having a height that is at least equal to the average spacing between the posts. Accordingly, Applicants respectfully submit that claim 16 is further patentably distinguishable over the prior art.

Applicants respectfully submit that claims 19 and 20, which depend from claim 18, are also patentably distinguishable over the prior art for at least the reasons discussed above with respect to claim 18, and, thus, are in condition for allowance.

Claims 5 to 7 and 9 are rejected under 35 U.S.C. § 103 (a) as being unpatentable over the '264 patent in view of U.S. Patent No. 5,917,570 to Bryan-Brown et al. (hereinafter "the '570 patent").

Applicants respectfully submit that the '264 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts which have a width in the range of about 0.2 to 3  $\mu\text{m}$ , as required by claim 5. As discussed above, the '264 patent does not disclose or suggest a two dimensional array of alignment posts. Further, as discussed above, the '264 patent does not disclose or suggest at col. 5, lines 11 to 19 or anywhere else in the '264 patent, that "each feature has a width in the range of about 0.5  $\mu\text{m}$ ," as asserted by the Action.

The '570 patent fails to cure the deficiencies of the '264 patent. First, contrary to the assertion of the Action, one of ordinary skill in the art would not be motivated to modify the liquid crystal device of the '264 patent with the teaching of the '570 patent by adding a surfactant to induce local homeotropic alignment in the liquid crystal material.

In fact, the '264 patent teaches away from addition of a surfactant. The purpose of the grating in the '264 patent is to provide a surface alignment for aligning a ferroelectric liquid crystal device (see Abstract and col. 1, lines 6 to 7). Col. 3, line 66 to col. 4, line 3 states that "[c]onventional surface stabilized ferroelectric bistable devices switch between two stable states having alignment either side of a surface alignment direction favoured by the rubbing directions." As is well known from the prior art (for example, the Berreman reference at page 4 of the present application) rubbed surfaces tend to give planar alignment. This planar alignment is needed for operation of the surface stabilized ferroelectric bistable device. It is further stated at col. 4, lines 3 to 6 that "[f]or devices of the present invention both cell walls have bigrating alignment and switch between two stable states having alignment either side of a principle grating direction. The polarisers 13, 13' are arranged with their polarization axis crossed with respect to one another with the axis of one polariser parallel to one of the two (switched) stable state alignment directions." Thus, for a polariser to be parallel with one of the alignment states, the alignment state must be planar or tilted planar, not homeotropic. The device of the '264 patent would not work with homeotropic alignment, therefore, one of ordinary skill in the art would not combine the surfactant of the '570 patent with the device of the '264 patent to induce local homeotropic alignment in the liquid crystal material.

Even if one were motivated to combine the '264 patent and the '570 patent, the '570 patent fails to cure the deficiencies of the '264 patent. Specifically, the '570 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts, as required by claim 5.

Accordingly, Applicants respectfully submit that claim 5 is patentably distinguishable over the prior art, alone or in combination, and, thus, is in condition for allowance.

Applicants respectfully submit that the '264 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts which are spaced from about 0.1 to 5  $\mu\text{m}$  apart from each other, as required by claim 6. As

discussed above, the '264 patent is directed to gratings and not to a two dimensional array of alignment posts. As the Action states, the '264 patent fails to disclose or suggest the feature dimension of spacing from about 0.1 to 5  $\mu\text{m}$  apart from each other.

Even if motivation existed to combine the '570 patent with the '264 patent, which Applicants have argued above is not present, the '570 patent fails to cure the deficiencies of the '264 patent. Specifically, the '570 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts, as required by claim 6.

Accordingly, Applicants respectfully submit that claim 6 is patentably distinguishable over the prior art, alone or in combination, and, thus, is in condition for allowance.

Applicants respectfully submit that the '264 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts and liquid crystal material containing a surfactant, each as required by claim 7. As discussed above, the '264 patent is directed to gratings and not to a two dimensional array of alignment posts. As the Action states, the '264 patent fails to disclose or suggest a surfactant.

Even if motivation existed to combine the '570 patent with the '264 patent, which Applicants have argued above is not present, the '570 patent fails to cure the deficiencies of the '264 patent. Specifically, the '570 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts, as required by claim 7. Further, the '570 patent fails to disclose or suggest liquid crystal material containing a surfactant, as required by claim 7. Col. 6, lines 10 to 19 of the '570 patent describe a grating surface treated with a homeotropic surfactant, such as lecithin. The '570 patent does not disclose or suggest liquid crystal material that contains a surfactant.

Accordingly, Applicants respectfully submit that claim 7 is patentably distinguishable over the prior art, alone or in combination, and, thus, is in condition for allowance.

Applicants respectfully submit that the '264 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts which are of at least one of a different height, different shape, different tilt and different orientation in different regions of the device, as required by claim 9. As discussed above, the '264 patent is directed to gratings and not to a two dimensional array of alignment posts. Also as discussed above, neither col. 3, lines 46 to 50, nor anywhere else in the '264 patent, discloses or suggest "the features are of at least one of a different height, different shape, different tilt and different orientation in different regions of the device."

Even if motivation existed to combine the '570 patent with the '264 patent, which Applicants have argued above is not present, the '570 patent fails to cure the deficiencies of the '264 patent. Specifically, the '570 patent fails to disclose or suggest a surface alignment structure having a two dimensional array of alignment posts, as required by claim 9. Further, the '570 patent fails to disclose or suggest alignment posts which are of at least one of a different height, different shape, different tilt and different orientation in different regions of the device, as required by claim 9.

Accordingly, Applicants respectfully submit that claim 9 is patentably distinguishable over the prior art, alone or in combination, and thus is in a condition for allowance.

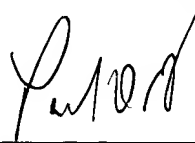
Claim 22 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over the '570 patent in view of U.S. Patent No. 6,266,122 to Kishimoto et al. (hereinafter "the Kishimoto et al. patent").

Applicants respectfully submit that the '570 patent fails to disclose or suggest a surface alignment structure having an array of alignment posts which are at least one of shaped and orientated to produce desired alignments to a liquid crystal director in at least three azimuthal directions, as required by claim 22. The '570 patent is directed to gratings and does not disclose or suggest a surface alignment structure having an array of alignment posts. Further, as stated in the Action, the '570 patent fails to disclose or suggest desired alignments to a liquid crystal director in at least three azimuthal directions.

The Kishimoto et al. patent fails to cure the deficiencies of the '570 patent. Specifically, the Kishimoto et al. patent fails to disclose or suggest a surface alignment structure having an array of alignment posts, as required by claim 22. The Kishimoto et al. patent relates to a display in which a plurality of liquid crystal regions are created by polymer wall partitions. These polymer wall partitions are clearly not an array of alignment posts. Accordingly, Applicants respectfully submit that claim 22 is patentably distinguishable over the prior art, alone or in combination, and thus is in a condition for allowance.

Accordingly, Applicants respectfully submit that all claims presented in this application patentably distinguish over the prior art and their combinations. Therefore, Applicants respectfully request favorable consideration and passage of the application to allowance.

Respectfully submitted,



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